

On the Arc Spectrum of Scandium.

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[PLATE 11.]

During the course of an investigation recently communicated to the Society upon the spectra of certain rare earthy meteorites,* a novel method was adopted to render these bodies sufficiently conducting to the passage of electricity to enable them to be used as electrodes for the production of an arc. As was then described, the method consists in powdering the substance, adding to it a certain proportion of finely-divided silver, and compressing the mixture into rods by means of an hydraulic press. I was in this way enabled to obtain the arc spectra of the meteorites without danger of contamination with any unknown impurity, as is the case when the usual method of burning the substance in the arc formed between carbon rods is resorted to.

I intimated at the time that it would prove a useful means of producing the arc spectra of other refractory substances, and recently I have produced spectra of yttria and of several rare earths by this method. Having prepared a quantity of pure scandia from the mineral wiikite,† I determined to examine its arc spectrum in this way.

In the note on scandia referred to I illustrated certain portions of the spectrum that were rich in the dominant lines of the element; these were prepared by sparking a strong solution of scandia between platinum electrodes. The arc spectrum of scandium has an important bearing upon astronomical research, and as the spectra hitherto published by various observers do not extend into the ultra-violet beyond the wave-length λ 3933, I thought that the complete spectrum within the range of my instrument, from λ 2420 to λ 6305, would be of value.

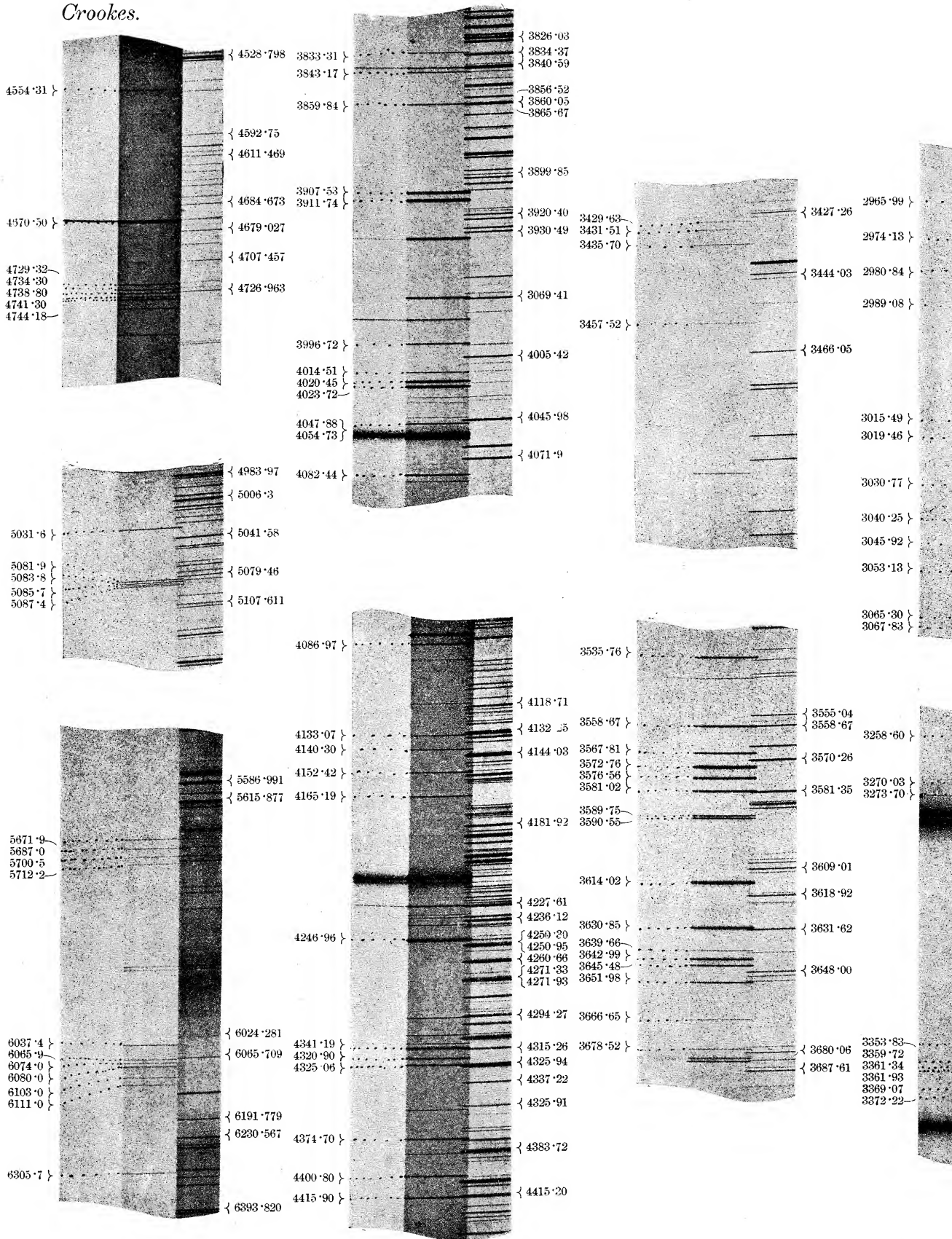
The method of working has been to project upon the sensitive film, by the employment of diaphragms placed in front of the slit in the manner described in previous communications, three spectra, the top one of iron, the middle that of scandium and silver, and at the bottom that of silver alone. In this way the scandium lines can be identified and their wave-lengths determined by reference to the published values for iron and silver.

The illustrations (Plate 11) accompanying this note show the appearance of the scandium arc groups and the accompanying iron lines that have been

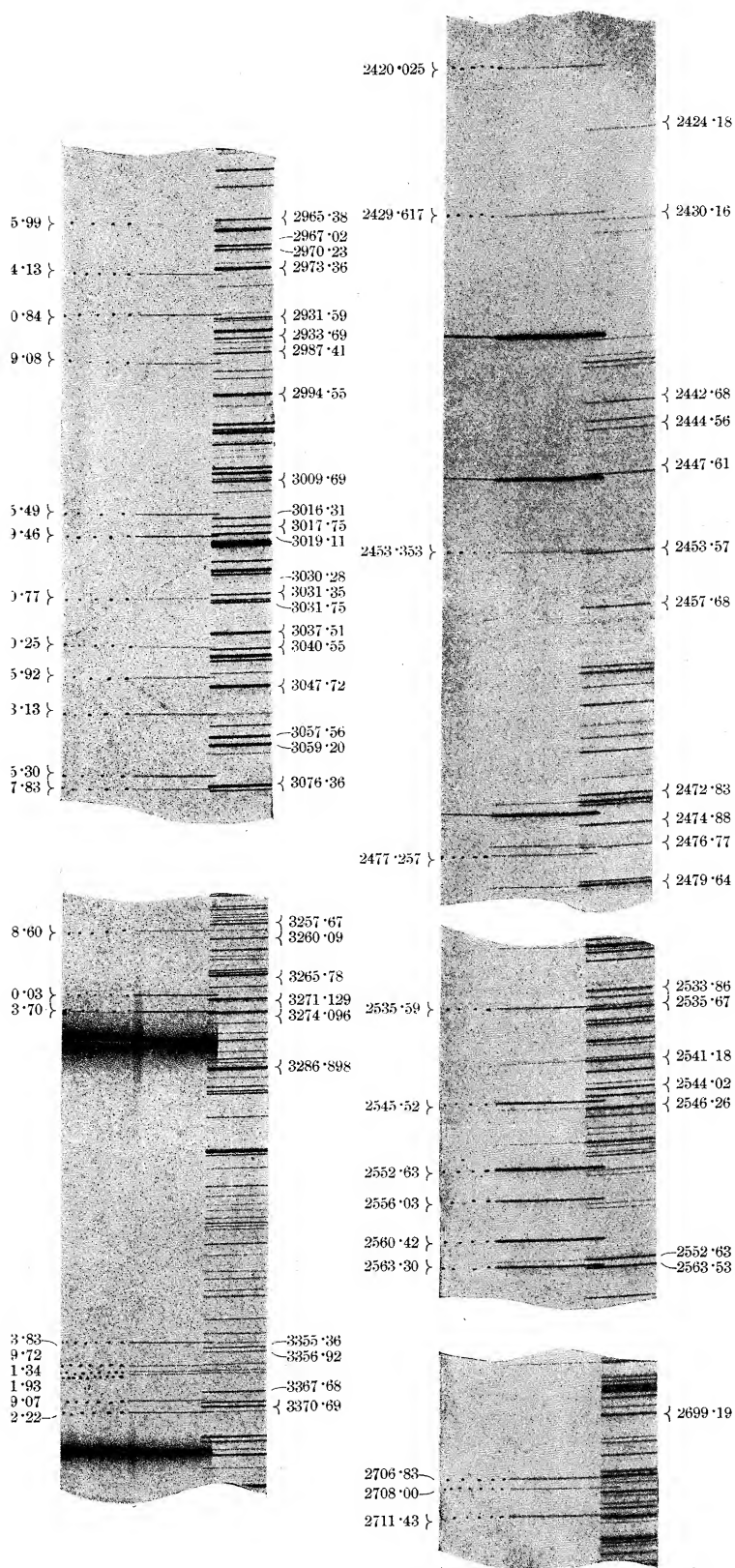
* "On the Photographic Spectra of Meteorites," 'Phil. Trans.,' A, vol. 127.

† "On Scandium," 'Phil. Trans.,' A, vol. 209.

Crookes.



THE ARC SPECTRUM OF SCANDIUM (with Silver).



used for the determination of the wave-lengths are marked. The reason for giving the spectrum in short portions is that reproductions by the half-tone process can be better carried out upon a series of small size blocks than upon one long one.

In the table of wave-lengths given each determination is the mean of a large number of successive measurements.

Arc Spectrum of Scandium.

Wave-length.	Intensity.	Wave-length.	Intensity.	Wave-length.	Intensity.	Wave-length.	Intensity.
2420·025	1	3270·03	6	3666·65	3	4554·31	4
29·617	2	73·70	6	78·52	4	4670·50	5
53·353	2	3353·83	5	3833·31	4	4729·32	5
77·257	2	59·72	3	43·17	5	34·30	5
2535·59	6	61·34	3	59·84	6	38·00	5
45·52	9	61·93	3	3907·53	10	41·30	6
52·63	10	69·07	4	11·74	10	44·18	6
56·03	8	72·22	5	96·72	8	5031·41	6
60·42	9	3429·63	1	4014·51	5	81·9	5
63·30	8	31·51	1	20·45	10	83·8	4
2706·83	10	35·70	2	23·72	10	85·8	4
08·00	8	57·52	2	47·88	7	87·4	3
11·43	9	3535·76	8	54·73	6	5671·9	3
2965·99	2	58·67	8	82·44	9	87·0	3
74·13	4	67·81	8	86·97	4	5700·5	2
80·84	5	72·76	10	4133·07	6	12·2	2
89·08	3	76·56	8	40·30	6	6037·4	4
3015·49	6	81·02	8	52·42	7	65·9	3
19·46	7	89·75	7	65·19	7	74·0	3
30·77	2	90·55	7	4246·96	11	80·0	4
40·25	3	3614·02	9	4341·19	9	6103·0	2
45·92	4	30·85	8	20·90	8	11·0	2
53·13	4	39·66	5	25·06	8	6305·7	4
65·30	5	42·99	9	74·70	8		
67·83	4	45·48	8	4400·80	7		
3258·60	3	51·98	8	15·90	7		

Naturally, the accuracy of the figures depends upon the values taken for the iron standards, and these figures are given on the spectra; any readjustment demanded by later determination of the wave-lengths of the iron lines can easily be made should occasion arise.

